Establishment of X-Ray Absorption Baselines in Orbital Test Satellites in Order to Assess Transistor Size of Components of Adversary Satellites

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Introduction

Although some information can be gleaned from the exterior parameters of a satellite including its purpose, nation of origin is more difficult to determine without having information concerning the elemental composition of the internal circuitry and the elemental composition of the hull of the orbital platforms.

Although methods exist which allow for the interior mapping of orbital platforms sc. the injection of aerosolized tritium gas followed by hyperspectral analysis of emissions after tritium settles upon components, these methods are expected to cease to be effective both due to the increasing use of electromagnetic shielding as well as electronic interference generated by the alpha particles associated with the tritium. 3-D maps showing the relative placement of electronic components within orbital platforms can allow for later identification of the nation of origin of future platforms, however, these sorts of images are far from sufficient for informing us of the transistor size of electronic components, for example.

Abstract

Although it might be tempting to emit X-Rays from a discrete source in order to assess the transistor technology used in a satellite, this approach cannot be used in practice due to the likelihood of the detection of the assessment attempt as nearly all platforms are equipped with electromagnetic sensors designed to detect the approach of X-37-like craft which might be attempting to either probe, tag, or sabotage a platform.

Thus, I propose using the natural X-Ray energy emitted from the Sun in order to assess the size of the transistors within the electronic components of satellites. By determining the transistor size of components in the very latest satellites, adversary transistor fabrication capability can be accurately assessed either from orbital X-Ray detectors or from ground stations.

Although the effect on detected X-Rays would be subtle, our ability to make use of such subtle effects can be facilitated by a measurement baseline which can be obtained by launching test platforms outfitted with transistors of variant sizes and which are capable of altering their physical orientation in order to determine the baseline absorption effect under variable conditions of orientation. A baseline for future transistor diameters could even be established by printing cards with non-functioning metallic doping at a specific interval which would have X-Ray absorptive effects regardless of the functionality of the transistors.

Also at issue are transistor materials. X-Rays could be expected to be differentially absorbed not only according to the size of the transistors, but their composition. As experimental transistor materials are being tested by various nations, it would be useful for a given nation to be able to determine of what material a transistor is composed from a distance so that fabrication processes may be,at least, imitated when found to be superior to domestic methods.

This proposed approach is made practical by the nearness of the diameter of modern transistors to the phase high of X-Rays which have, for quite some time, fallen within our ability to detect. X-Rays are capable of penetrating most EM-blocking metamaterials and natural solar radiation at this frequency can reveal information concerning component size, provided sufficient image resolution and contrast. Only recently has the level of contrast of X-Ray sensors reached the point whereas this type of intelligence gathering has become practical.

At these extreme frequencies, the intensity of solar radiation as a proportion of total radiation follows a predictable intensity curve as frequency increases. The Sun generates a great deal of infrared light, for example, but far less ultraviolet light. X-Rays are generated in smaller quantities and gamma in even smaller quantities. When a satellite which incorporates semiconductor transistors of a given diameter passes between the Sun and Earth, it could be expected to absorb X-Ray radiation very efficiently at the specific wavelength which correlates to a phase height which matches the transistor diameter. For example, a 2nm transistor would efficiently absorb X-Ray energy with a 2nm phase height. X-Ray energy with a 2nm phase height generally has a wavelength of about 100nm or 1000 Angstroms, which is well-within our ability to detect.

Conclusion

Newly-launched platforms can provide clues as to the state of the art in terms of transistor fabrication capability in adversary nations without the needed to compromise insiders working in the field. This method has as its advantage that it does not interfere with the normal operations of the target platform and cannot be detected by the adversary.